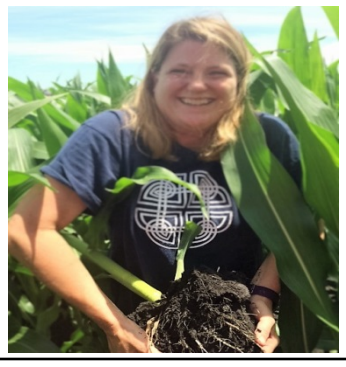
Farmers Choices



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Extern host site: Monsanto

Part I: Overview of Business

Monsanto is a fortune 500 company that was founded in 1901. It is based out of St. Louis, Missouri. They have 404 facilities in 66 countries and employ over 21,000 agricultural professionals.

- Monsanto is a sustainable agricultural company that supplies agricultural products that support farmers all around the world.
- The focus is to help farmers produce better, stronger crops in order to produce more per acre to increase yield.

Part II: Job Specifics

World population is increasing. Farmers are faced with growing more crops on the same or less land in order to meet the needs of the growing population.
It is estimated that the world population will grow from 7.4 billion today to an estimated 9.7 billion by 2050.

Part III: The Problem

- Many people today do not have enough food around the world
- How can farmers produce enough food to feed the increasing population on the same or less land.
- Farmers need to grow more crops (increase yield) on less acers.

Part IV: Background

Genetic engineering is the modification of DNA molecules to produce changes in plants and animals. Genetic engineering can be done over time by crossbreeding them with other plants and selecting the plants with the desired traits for the next generation of breeding. Recently, scientist have discovered that they can isolate the gene traits that they want in one plant and move them into another plant. Plants that are modified through this process are called Transgenic. This has advantages because now scientists can engineer seeds to possess desired genes or combinations of genes without the costly, time consuming traditional methods of crossbreeding and selection, which can meet specific needs of a certain geographical area. Some common desirable traits are weed resistance and insect resistance. For example, an area that primarily grows corn and is traditionally infested with corn borer insects. Farmers in that area can plant seeds that resist the corn borer and decrease or eliminate the need for farmers to apply insecticide to their fields.

When farmers grow corn, soybeans, or any other type of crop, their goal is to get the highest yield. When plants other than the desired crops grow in their fields i.e. weeds, it hurts their crops and which greatly decreases their yield. Before chemical control was available, farmers would cultivate or till and break up the soil, targeting the areas only with weeds. This is called mechanical control. The disadvantages of this type of control are it disturbs the organic matter found naturally in the soil and it releases more carbon dioxide into the atmosphere.

In current practice, farmers most commonly use chemical control. In the case of weeds, farmers apply a herbicide that is either selective or nonselective. Selective herbicides target a specific type of plant, for example types of grasses. Non-selective herbicides targets to kill all plants. The most commonly used herbicide is Roundup, which has an active chemical that kills the plants called glyphosate. This herbicide will kill any plant that it comes into contact with. Monsanto has developed a type of crop seed that is resistant to Roundup so when farmers spray their entire fields, it kills everything except for the desired crop, which leads to much higher yields.

Link to lesson plan for possible lab:

Part V: Business Solution

Monsanto is a leader in the production of transgenetic seeds. Their breeding program includes hybridization, cross-breeding and genetically engineering seeds. This gives the grower many options that can be tailored to meet the needs in their fields and maximize yield potential. Other methods to increases yield include seed spacing, seed depth, and the use of fertilizer where it is needed in the growers field.

Part VI: Student Solutions

Students have the option to explore the concept of increased yield through manipulation of different variables though a growing lab. Here the students would create an experiment that would explore techniques that growers use to increase their yield. They can choose from any variable such as seed spacing, seed depth, Round up Ready seeds, etc. Then they could plant their test plots (either on the campus or in containers) and carefully document and collect data on their experiment.
Link to example lesson